Dec. 9, 1952 F. MEYER 2,620,619

DOUBLE WINDING FOR HOROLOGICAL MOVEMENTS

Filed April 2, 1948 2 SHEETS—SHEET 1

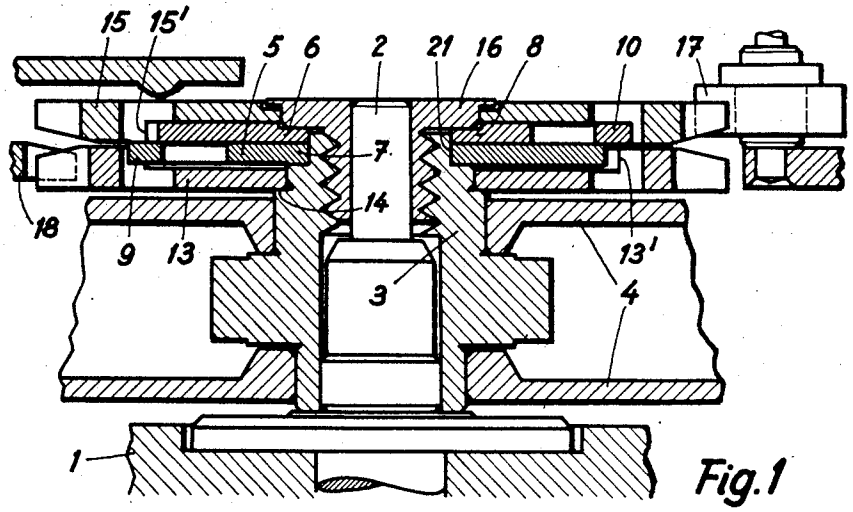

Fig.1

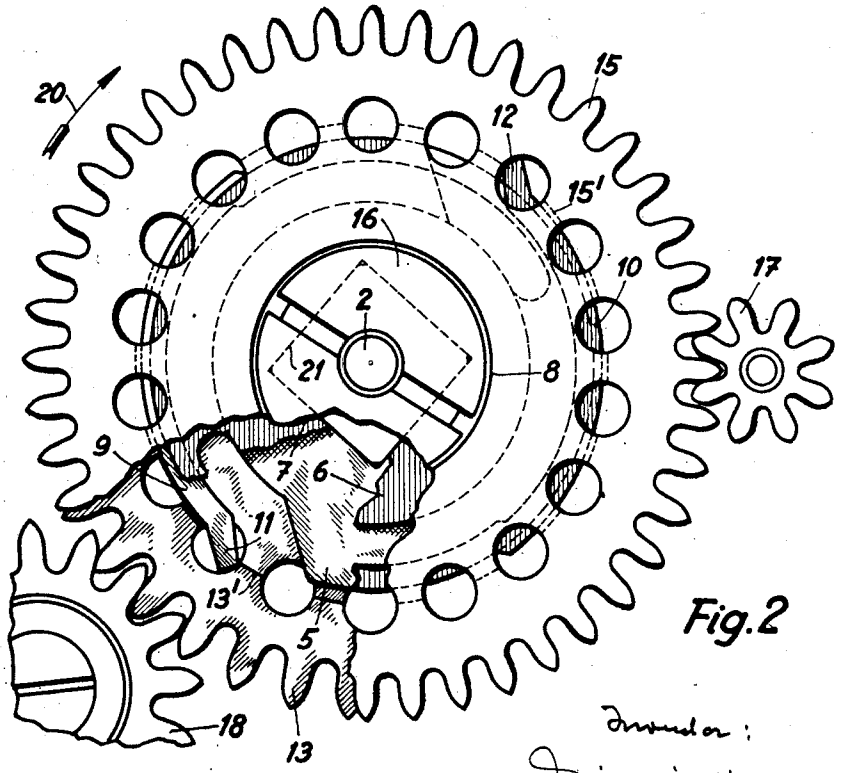

Fig.2

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DOUBLE WINDING FOR HOROLOGICAL MOVEMENTS

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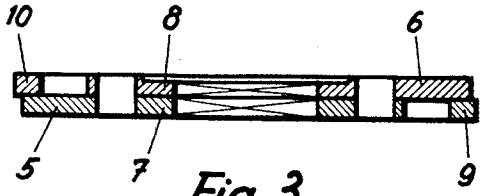

Fig. 3

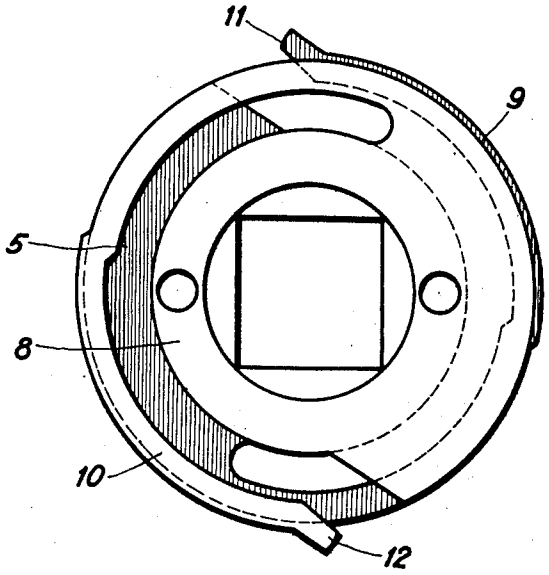

Fig. 4

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DOUBLE WINDING FOR HOROLOGICAL MOVEMENTS

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11 Claims. (Cl. 58—82)

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This invention relates to double winding for horological movements.

Watches with double winding are well-known in the art. The one winding may be electrical, the other mechanical, or in the case of self-winding wrist watches, the one may be a self-winding mechanism and the other be hand-operated.

The invention relates to the kind of double winding in horological movements with a mainspring in a barrel, in which the one device does not work when the other is in winding operation.

Object of the invention is to fix to the core or center of the barrel two pawl wheels the pawls of which engage internal toothings of winding wheels loosely rotating coaxially to the barrel axis, the pawls bearing against the top of the teeth of the internal toothings.

Other objects and features will be apparent as the following description proceeds, reference being had to the accompanying drawing showing one example of the invention. It is, however, understood that this invention is not necessarily limited thereto, as various changes in the shape, proportions and general assemblage of the parts may be resorted to without departing from the principle of the invention or sacrificing any of its advantages. In the drawings:

Fig. 1 is a section along the axis of the barrel arbor,

Fig. 2 is a plan view of parts belonging to the winding mechanism, some of these portions being partly broken away.

Fig. 3 is an axial section of the pawl wheels, and

Fig. 4 is a plan view of these wheels.

The barrel arbor 2 is tightly fixed to the plate 1. The barrel center or core 3 is rotatably mounted on this arbor 2. The barrel itself is designated by 4. The upper end of the core 3 is formed as a square 21 to which the hubs 7 and 8 of the pawl wheels 5 and 6 are fixed. The pawls of these wheels form long arc-shaped resilient parts 9 and 10 extending over about 180° of the wheels (Fig. 4). These pawls 9 and 10 end in fingers 11 and 12 directed towards the outside.

The finger 11 of the pawl wheel 5 engages the gaps of an internal toothing 13' provided on the circumferential wall of a recess of a winding wheel 13 loosely rotatable on the barrel center or core 3 and supported on a shoulder 14 of this core.

The finger 12 forming the free end of the resilient pawl 10 in a similar manner engages the gaps of an internal toothing 15' provided on the circumferential wall of a second winding

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wheel 15. This latter wheel is rotatably held by means of a pierced screw 16 screwed to the core 3. This screw 16 serves at the same time as a bearing bush for the core 3. The winding wheel 15 engages a pinion 17 of a winding mechanism, while the winding wheel 13 meshes with the pinion 18 of a second winding mechanism.

It is to be noted that the center of the outer circular rim of the pawls 9 and 10 lies in the axis of the barrel and that its radius is equal or substantially equal to that of the top circle of the internal toothing into the gaps of which the pawl enters. The pawls may thus be very thin and resilient. When, under the pressure exerted on them on winding, they undergo buckling stresses, they are guided by the top of the teeth against which they are then supported. However, if the fingers, on an idle movement of the pawl-wheels trail over the teeth of the corresponding internal toothings of the winding wheels, they offer but a slight resistance to this trailing movement which is not sufficient to take along the winding wheel in question.

The mainspring not shown in the barrel is wound up in the direction of the arrow 20. If this is done by means of the pinion 18 and the winding wheel 13, the movement is imparted to the core 3 by the pawl wheel 5 whose finger 11 engages the gaps of the internal toothing 13'. On this occasion the pawl-wheel 6 is taken along and its finger 12 trails easily over the teeth of the toothing 15' without taking along the wheel 15. If, on the contrary, the mainspring is wound up by the pinion 17 driving the winding wheel 15, the finger 12 is engaged while the finger 11 trails over the teeth of the wheel 13.

While I have described and illustrated one embodiment of my invention, I do not wish to unnecessarily limit the scope of this invention, but reserve the right to make such modifications and rearrangements of the several parts as may come within the purview of the accompanying claims.

What I claim is:

1. In a double winding mechanism for horological movements, a fixed part, a barrel arbor mounted on said fixed part, a barrel mounted on said barrel arbor, winding wheels mounted on said barrel arbor and provided with annularly arranged internal teeth, pawl wheels mounted on said barrel arbor, having resilient pawl members engaging said internal teeth, the outer edge of said pawl members being located close to the crests of said internal teeth to allow said pawl members to bear against the crests of said internal teeth when undergoing buckling stresses, each of said pawl wheels and pawl member there-

of consisting of one, flat piece of thin, sheet material.

2. In a double winding mechanism for horological movements, a fixed part, a barrel arbor mounted on said fixed part, a barrel mounted on said barrel arbor, winding wheels pivotally mounted on said barrel arbor and provided with annular internal teeth, pawl wheels coupled with said barrel arbor, and arranged in the interior of said winding wheels, and having resilient pawl members engaging said internal teeth, the outer edge of said pawl members lying close to the crests of said internal teeth to allow said pawl members to bear against the crests of said internal teeth when undergoing buckling stresses, each of said pawl wheels and pawl member thereof consisting of one, flat piece of thin, sheet material.

3. In a double winding mechanism for horological movements, a fixed part, a barrel arbor mounted on said fixed part, a barrel mounted on said barrel arbor, winding wheels pivotally mounted on said barrel arbor and provided with internal annular teeth, pawl wheels coupled with said barrel arbor, arranged in the interior of said winding wheels, and having resilient, elongated pawl members provided with projections engaging said internal teeth, said pawl members being located close to the crests of said internal toothings to allow said pawl members to bear against the crests of said internal teeth when undergoing buckling stresses, each of said pawl wheels and pawl member thereof consisting of one, flat piece of thin, sheet material.

4. In a double winding mechanism for horological movements, a fixed part, a barrel arbor mounted on said fixed part, a barrel mounted on said barrel arbor, winding wheels mounted on said barrel arbor and provided with internal annular teeth, pawl wheels mounted on said barrel arbor, arranged in the interior of said winding wheels, and having resilient, elongated pawl members extending over an outer part the pawl wheels and having an outer arcuate edge which is substantially concentric with said winding wheels, said pawl members being provided with projections engaging said internal teeth, on the radius of the outer arcuate edge of said pawl members being substantially equal to the radius of the circle passing through the crests of said internal teeth to allow said pawl members to bear against the crests of said internal teeth when undergoing buckling stresses, each of said pawl wheels and pawl member thereof consisting of one, flat piece of thin, sheet material.

5. In a double winding mechanism for horological movements, a fixed part, a barrel arbor mounted in said fixed part, a barrel mounted on said barrel arbor, winding wheels pivotally mounted on said barrel arbor and provided with internal teeth, pawl wheels coupled with said barrel arbor, arranged in the interior of said winding wheels, and having arc-shaped resilient pawl members extending over a portion of the circumference of the pawl wheels with their outer circumference substantially concentric with said winding wheels, said pawl members being provided with projections to cooperate with said internal teeth, and the radius of the outer circumference of said pawl members being substantially equal to the radius of the circle passing through the crests of said internal teeth to allow said pawl members to bear against the crests of said internal teeth on undergoing buckling stresses, each of said pawl wheels and pawl member thereof consisting of one, flat piece of thin, sheet material.

6. In a double winding mechanism for horological movements, a fixed part, a barrel arbor mounted on said fixed part, a barrel pivotally mounted on said barrel arbor, winding wheels pivotally mounted on said barrel arbor and provided with internal and external annular teeth, winding pinions engaging the external teeth of said winding wheels, pawl wheels arranged in the interior of said winding wheels, having hubs coupled with said barrel arbor, and arc-shaped resilient pawl members integral with the pawl wheel hubs and extending over a portion of the circumference of the pawl wheels with their outer circumference substantially concentric with said winding wheels, and projections provided on the free end of said pawl members, directed away from the center of the pawl wheels to cooperate with said internal teeth, the radius of the outer circumference of said pawl members being substantially equal to the radius of the circle passing through the crests of said internal teeth to allow said pawl members to bear against the crests of said internal teeth when undergoing buckling stresses, each of said pawl wheels and pawl member thereof consisting of one, flat piece of thin, sheet material.

7. In a double winding mechanism for horological movements, a fixed part, a barrel arbor fixed to said fixed part, a barrel pivotally mounted on said barrel arbor and comprising a core, winding wheels pivotally mounted on said core and provided with internal and external annular teeth, winding pinions engaging the external teeth of said winding wheels, pawl wheels arranged in the interior of said winding wheels, having hubs coupled with said core, and arc-shaped resilient pawl members integral with the pawl wheel hubs and extending over about 180° of the circumference of the pawl wheels with their outer circumference substantially concentric with said winding wheels, and fingers provided on the free end of said pawl members and being directed away from the center of the pawl wheels to cooperate with said internal teeth, the radius of the outer circumference of said pawl members being substantially equal to the radius of the circle passing through the crests of said internal teeth to allow said pawl members to bear against the crests of said internal teeth when undergoing buckling stresses, each of said pawl wheels and pawl member thereof consisting of one, flat piece of thin, sheet material.

8. In a double winding mechanism for horological movements, a fixed part, a barrel arbor fixed to said fixed part, a barrel pivotally mounted on said barrel arbor and comprising a core having a square portion, winding wheels pivotally mounted on said core and provided with internal and external annular teeth, winding pinions engaging the external teeth of said winding wheels, pawl wheels arranged in the interior of said winding wheels, having hubs with square holes fitting said square portion, and arc-shaped resilient pawl members integral with the pawl wheel hubs and extending over about 180° of the circumference of the pawl wheels with their outer circumference substantially concentric with said winding wheels, and fingers provided on the free end of said pawl members and being directed away from the center of the pawl wheels to cooperate with said internal teeth, the radius of the outer circumference of said pawl members being substantially equal to the radius of the circle passing through the crests of said internal

teeth to allow said pawl members to bear against the crests of said internal teeth when undergoing buckling stresses, each of said pawl wheels and pawl member thereof consisting of one, flat piece of thin, sheet material.

9. In a winding mechanism for horological movements having a rotatable barrel arbor, in combination, a pair of rotatably mounted winding wheels concentrically located with respect to each other and each having an outer face located closely adjacent to the other winding wheel, each of said winding wheels being formed with a substantially circular recess in said outer face thereof and being provided with a plurality of internal, annular teeth located about said recess; and a pair of pawl wheels operatively connected to said barrel arbor for rotating the same and each having an arcuate, springy pawl member having a free end respectively engaging the internal teeth on one of said winding wheels and each pawl member being respectively located adjacent to said internal teeth of one of said winding wheels so as to bear against the same when said pawl members are subject to buckling forces, said pawl wheels and their pawl member each being of a substantially smaller thickness than said winding wheels and each being respectively located almost completely within said recesses and said pawl wheels and pawl members thereof bearing against each other to mutually reinforce each other against buckling.

10. In a winding mechanism for horological movements having a rotatable barrel arbor, in combination, a pair of winding wheels concentrically mounted closely adjacent to each other for turning movement about the axis of the barrel arbor and each having a side surface facing the other winding wheel, each of said side surfaces of said winding wheels being formed with a substantially circular recess and being provided with a plurality of internal, annularly arranged teeth located about said recess, said recesses facing each other to form between said winding wheels a chamber larger than the space between said winding wheels; and a pair of one-piece, flat, sheet material pawl wheels located against each other respectively within said recesses and substantially filling the chamber formed by the same, each pawl wheel being operatively connected to the barrel arbor for turning the same and having an arcuate springy pawl member provided with a free end engaging the teeth about the recess in which the respective pawl wheel is located, whereby said pawl members mutually reinforce each other against buckling forces.

11. In a winding mechanism as defined in claim 10, each of said pawl wheels having a central hub portion which is joined to the barrel arbor, and each of said arcuate springy pawl members having a width which is substantially greater than the thickness thereof.

FRIEDRICH MEYER.

REFERENCES CITED

The following references are of record in the file of this patent:

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